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MAN-CAUSED FIRE ANALYSIS, 1972

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REPLY TO: 5110 Prevention April 26, 1972

SUBJECT: Man-Caused Fire Analysis (Ten Forests with most severe M-C fire problem)

TO: Regional Foresters

Enclosed is an analysis of man-caused fires for the 1962-71 decade. The analysis updates a similar study conducted in 1971.

On the basis of last year's study, twelve Forests accounted for 36 percent of the annual average M-C fire resource losses. One year later ten Forests had 51 percent of annual average losses.

This is a realistic means for evaluating overall effectiveness of fire prevention efforts. Generally, we have found the combination of high occurrence, large acreage losses and excessive damage is related to inadequate emphasis on fire prevention.

It is disturbing to have high losses and damage when seasonal severity is not unusually high, and damages and losses resulted from failure to initiate adequate fire prevention measures.

In analyzing the ten Forests study data, there appears to be good correlation between seasonal severity and man-caused fire occurrence. This correlation reinforces the need for initiating vigorous prevention activities and closures during severe weather conditions. The results of such a program are illustrated on the Coconino N.F. Severity Ratio Chart. Man-caused fire occurrence was held to a minimum in 1971 during the highest seasonal severity ever recorded.

The principles discussed in this analysis are applicable to any Forest in the National Forest System. We encourage everyone to work at improving their prevention efforts.

HENRY W. DeBRUIN
Director of Fire Control

Enclosure

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MAN-CAUSED FIRE ANALYSIS, 1972

The 1972 man-caused fire analysis updates a similar study completed in 1971. The 1972 study includes development of M-C Fire Activity Severity ratios. The two-part analysis consists of (1) analysis of 1962-71 M-C fire statistics ranking all Forests in the N.F.S. by relative M-C Fire Activity Severity, and (2) an analysis of 1962-71 fire statistics by individual Forests to develop M-C Fire Activity Severity Ratios.

PART ONE

Relative M-C Fire Severity

All Forests within the National Forest System were numerically ranked according to relative seriousness of M-C fire problems. The following procedures were used:

A. Occurrence - The 1962-71 M-C fire average occurrence by individual Forests. Average occurrence 1962-71 compared to average occurrence for all Forests expressed as a simple percentage.

B. Burned Area - The 1962-71 M-C average area burned by individual Forests. Average burned area, 1962-71, compared to average burned area for all Forests expressed in a simple percentage.

C. Damage - The 1962-71 average M-C damages by individual Forests. Average damage 1962-71 compared to average damage for all Forests expressed in a simple percentage.

D. Trend - The 1962-71 average M-C fire occurrence by individual Forests compared to the 1969-71 average occurrence for each Forest expressed in a simple percentage.

E. Total M-C Fire Severity - The relative severity of individual Forests is the sum of the simple percentages derived from occurrence, acres burned, damage, and trend.

Chart #1 illustrates the relative M-C Severity of the worst ten Forests in the N.F.S. with the most severe M-C fire problems. The Shasta Trinity, Clark, Ozark-St. Francis, and Cleveland National Forests are very close to the worst ten group. The M-C fire situation on the Clark N.F.,

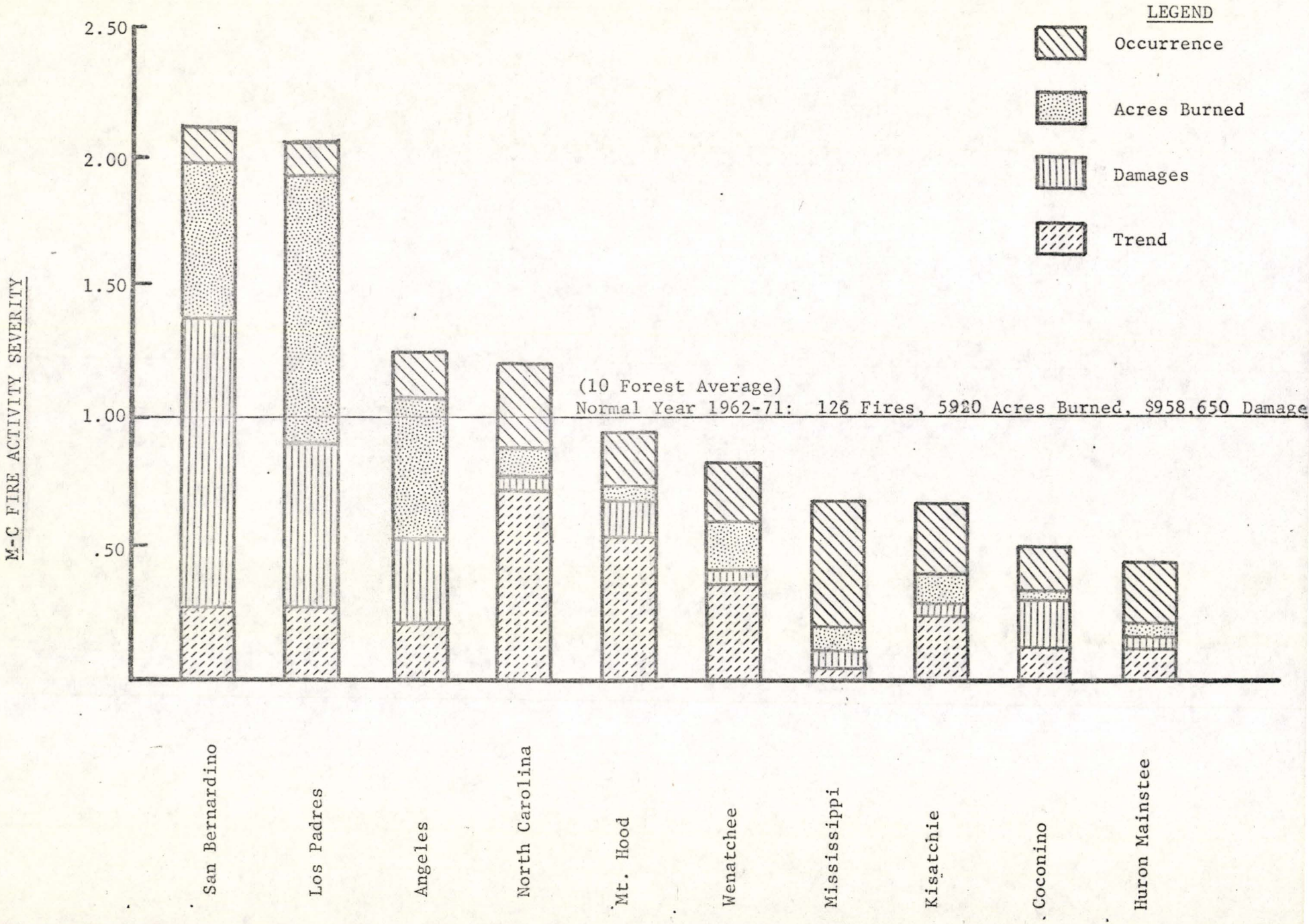
Shasta Trinity N.F. and Ozark-St. Francis N.F. is improving. The Cleveland N.F. will probably be in the worst ten next year unless the trend in M-C severity is reversed.

These worst ten Forests burned over 40 percent of the annaul average M-C acreage burned in the N.F.S. They accounted for over 51 percent of M-C fire damage of 9.5 million dollars annually.

The revised statistical reporting procedures have an effect on the number of M-C fires reported since 1969. However, all Forests use the same reporting procedures so the relative comparison is valid. Also, the reporting procedures do not influence the number of acres burned or resource values lost.

M-C FIRE ACTIVITY SEVERITY

Ten National Forests With Most Severe M-C Fire Problems
(1962-71 Data)



FIRES BY SPECIFIC CAUSES

TEN WORST FORESTS, 1962 - 71

	Equipment	Smoking	Recreation	Forest Utilization	Land Occupancy	Incendiary	Misc.
1962	99	222	140	26	136	317	65
1963	74	230	183	57	194	397	73
1964	66	186	198	51	149	164	69
1965	107	207	256	19	118	164	70
1966	128	199	197	29	171	157	108
1967	139	222	218	21	141	252	69
1968	132	176	198	24	186	262	111
1969	212	225	278	41	161	353	100
1970	77	218	424	150	439	492	351
1971	58	167	289	90	481	299	268
Total	1,092	2,052	2,381	508	2,176	2,857	1,284

PART TWO

M-C Fire Activity Severity Ratios

The introduction of fire activity severity ratios by Fire Research in 1969, representing combined levels of occurrence and burned area, generated widespread interest. Mr. John Keetch, Fire Control Scientist, further refined procedures for establishing reliable ratios in 1970. The procedures he used are discussed in "Relative Severity Rating Summary, 1970" sent to all Regions May 24, 1971.

A. Forest M-C Fire Severity Ratios - Mr. Keech computed the fire load indexes by using the spread and build-up index at basic observation time from selected fire danger stations. Representative zone severity ratios for each Forest were taken from Keetch's "Relative Severity Rating Summary, 1970" and the current 1971 ratios. (Shown as solid line on charts.)

B. M-C Fire Activity Severity Ratios - The average of the sum of occurrence, damage and acres burned activity expressed in a simple percentage. (Shown as a heavy, broken line on charts.)

C. Occurrence Activity Ratios - Individual Forest average M-C fire occurrence, 1962-71, compared to average yearly occurrence 1962-71 expressed as a simple percentage. (Shown as a broken line on charts.)

D. Damage Activity - Individual Forest average M-C damage by year, 1962-71 as compared to average yearly damages 1962-71 expressed as a simple percentage.

E. Acres Burned Activity - Individual Forest average M-C acres burned, 1962-71, as compared to average yearly acres burned 1962-71 expressed in a simple percentage.

M-C fire activity ratings, produced in graphic form, are especially interesting when related to the total man-caused fire prevention problem. For example:

A. Seasonal severity ratios and M-C fire severity ratios for the ten "high" Forests appear to be correlated when M-C fire goals are achieved. Generally, with effective fire prevention, occurrence will fall below severity. However, M-C Fire Activity Severity will tend to be above Seasonal Severity whenever high acreages are burned, or severe damages occur.

B. High M-C fire activity severity will normally correlate with high seasonal severity and high fire occurrence on units having effective fire prevention programs. For example, the Clark N.F., Region 9, dropped from the worst ten Forests in 1971. The enclosed chart for the Clark clearly indicates a reduction in M-C fire occurrence and effective fire prevention. Occurrence on the Clark starts to fall below severity after 1969 with a continuing favorable comparison during 1970 and 1971. The same positive relationship is illustrated on the Shasta Trinity. Both Forests are no longer in the worst ten.

The severity ratio charts for the worst ten Forests illustrate a more negative correlation. M-C fire occurrence generally does not reflect seasonal severity. High acreage losses often occur during relatively low severity. M-C fire trends are often severe and erratic. In many instances, high damage occurs from M-C fires caused directly by our own operations.

Often the relationship of occurrence, severity, and fire activity ratios reflect success or failure of elements of the fire management job.

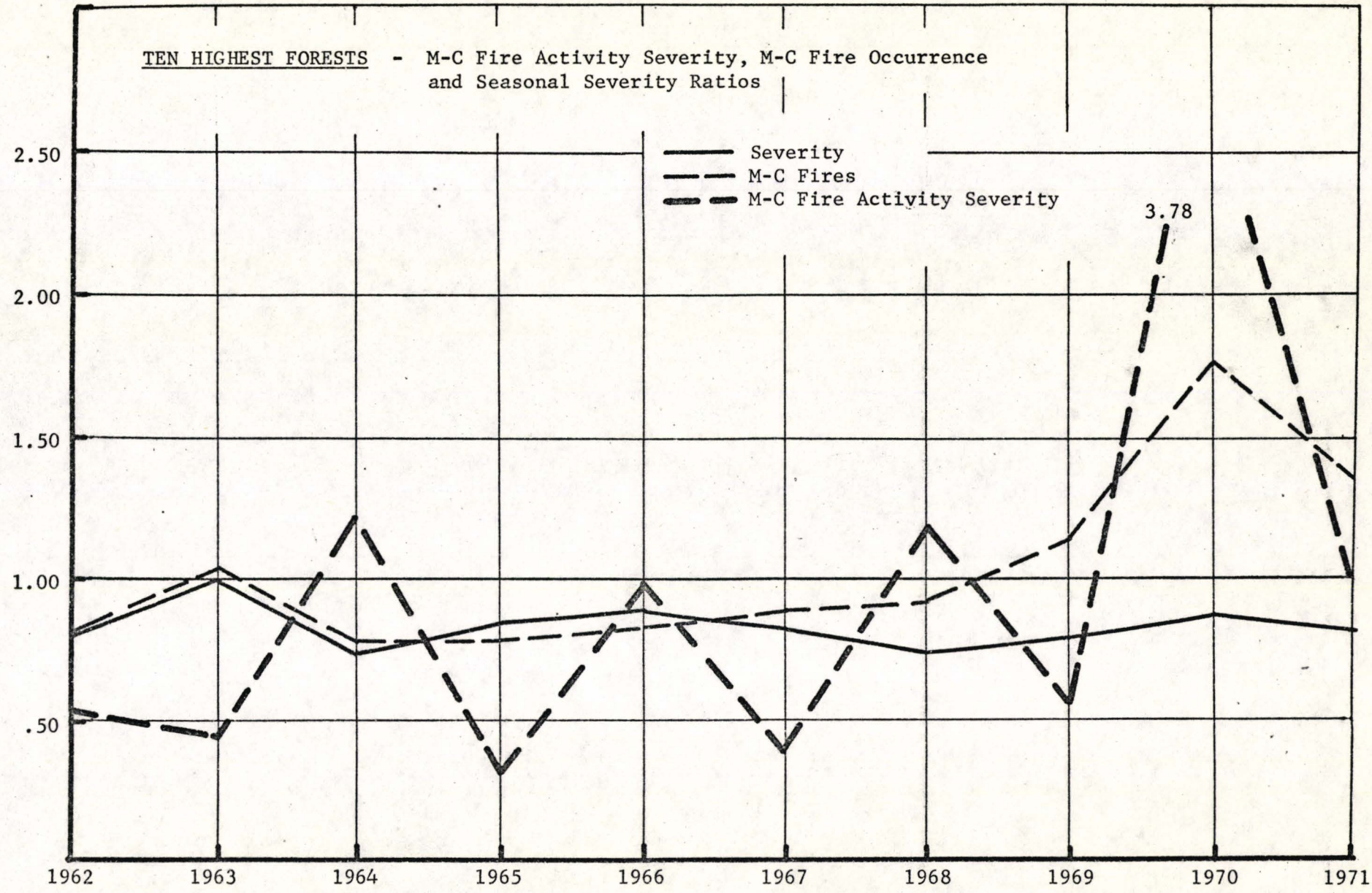
A. High M-C fire occurrence ratios reflect a fire prevention failure.

B. High fire activity severity results from failure to hold losses and damage to reasonable levels.

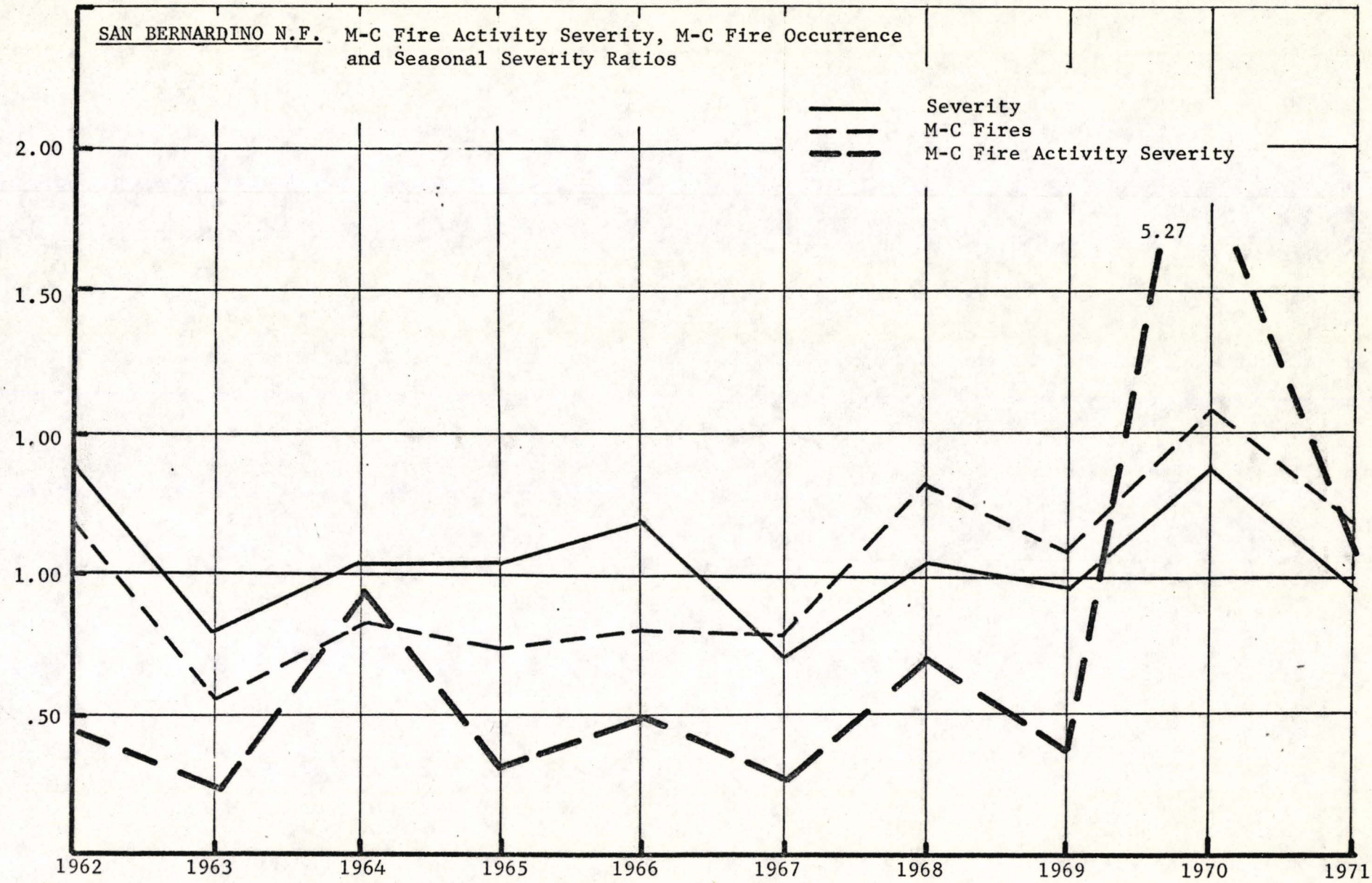
C. High fire activity severity could also result from failures in initial attack capability.

D. High fire activity severity may also be a reflection of failures in fuel management accomplishments.

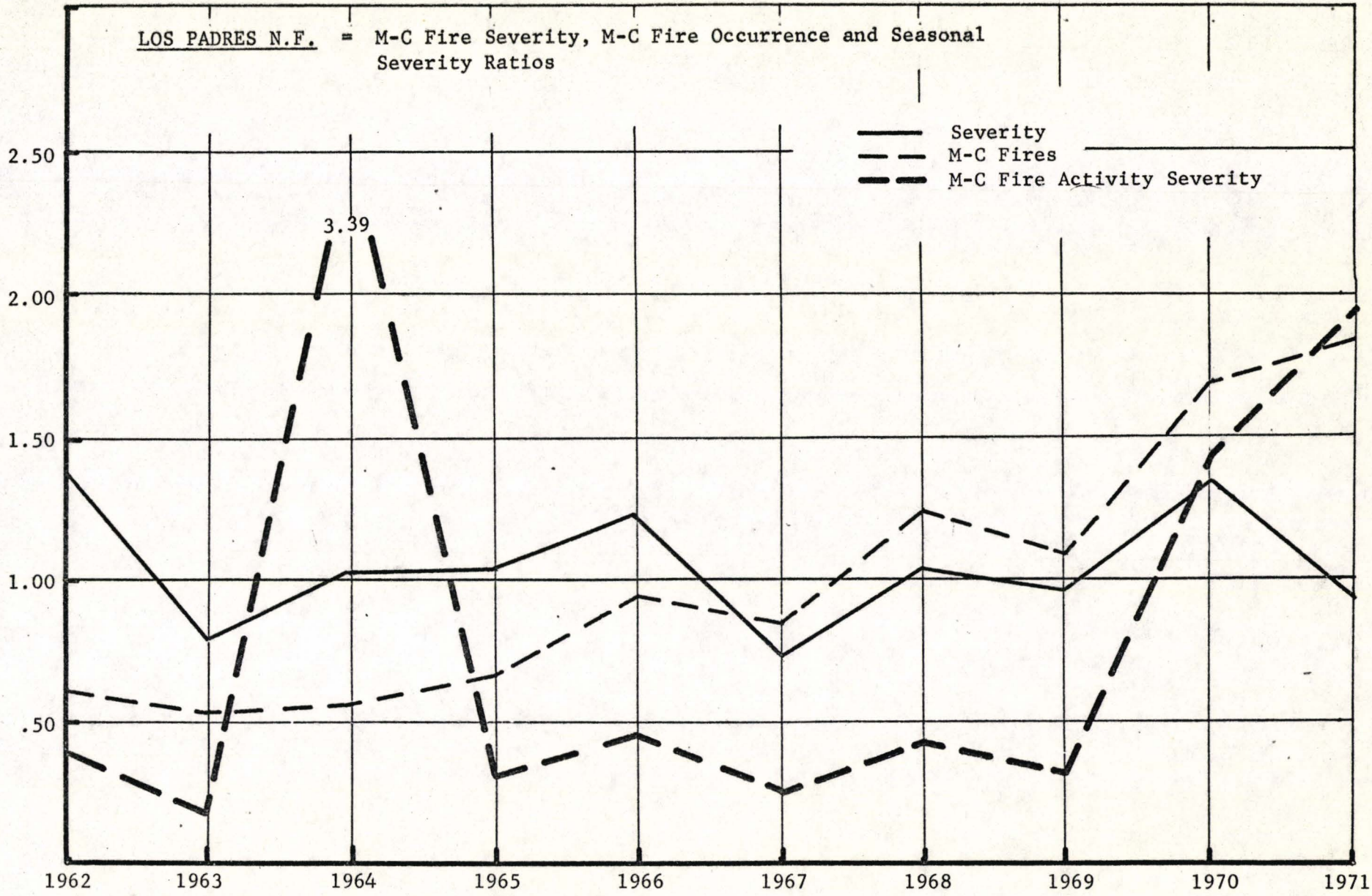
The graphic analysis of the worst ten Forests clearly depicts problem areas. Damage, acreage burned, occurrence, and trends are continuing to accelerate. There are many factors that add or delete a Forest to or from the worst ten. The 1972 analysis indicates this to be a result of the relative effectiveness of the Forest's overall fire management program, especially in the area of fire prevention.



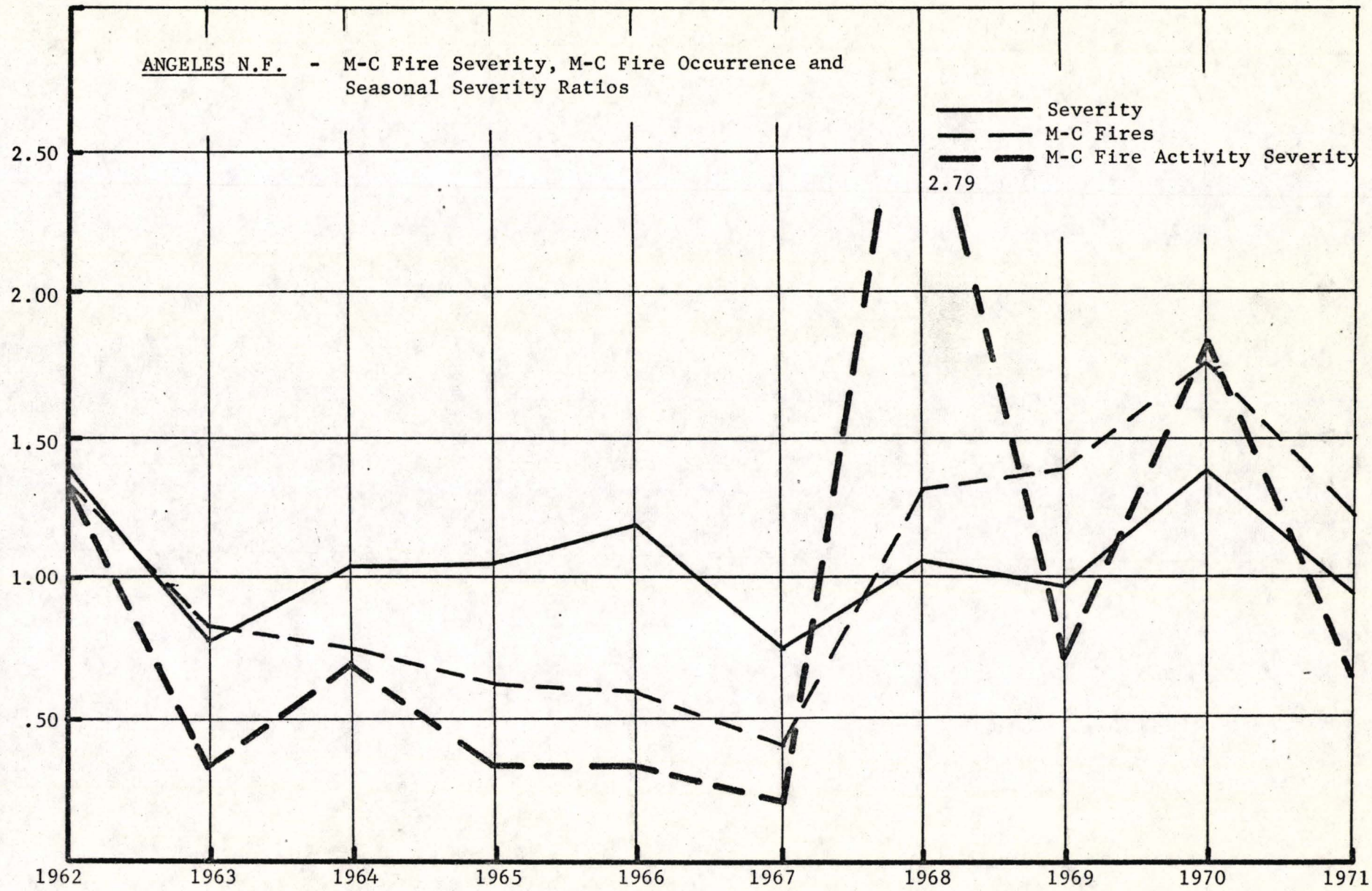
1.00 = 1962-71 Severity, Representative Zones, 10 Forests Average
1.00 = M-C Fires, Average 1962-71, 1261 Fires
1.00 = Fire Activity (Severity): M-C Fires, 1962-71 Ave. 1261 Fires; M-C Acres Burned, 1962-71, Ave. 59,205 Acres; Damages, 1962-71 Ave. M-C Fire Damage $9,586,493.



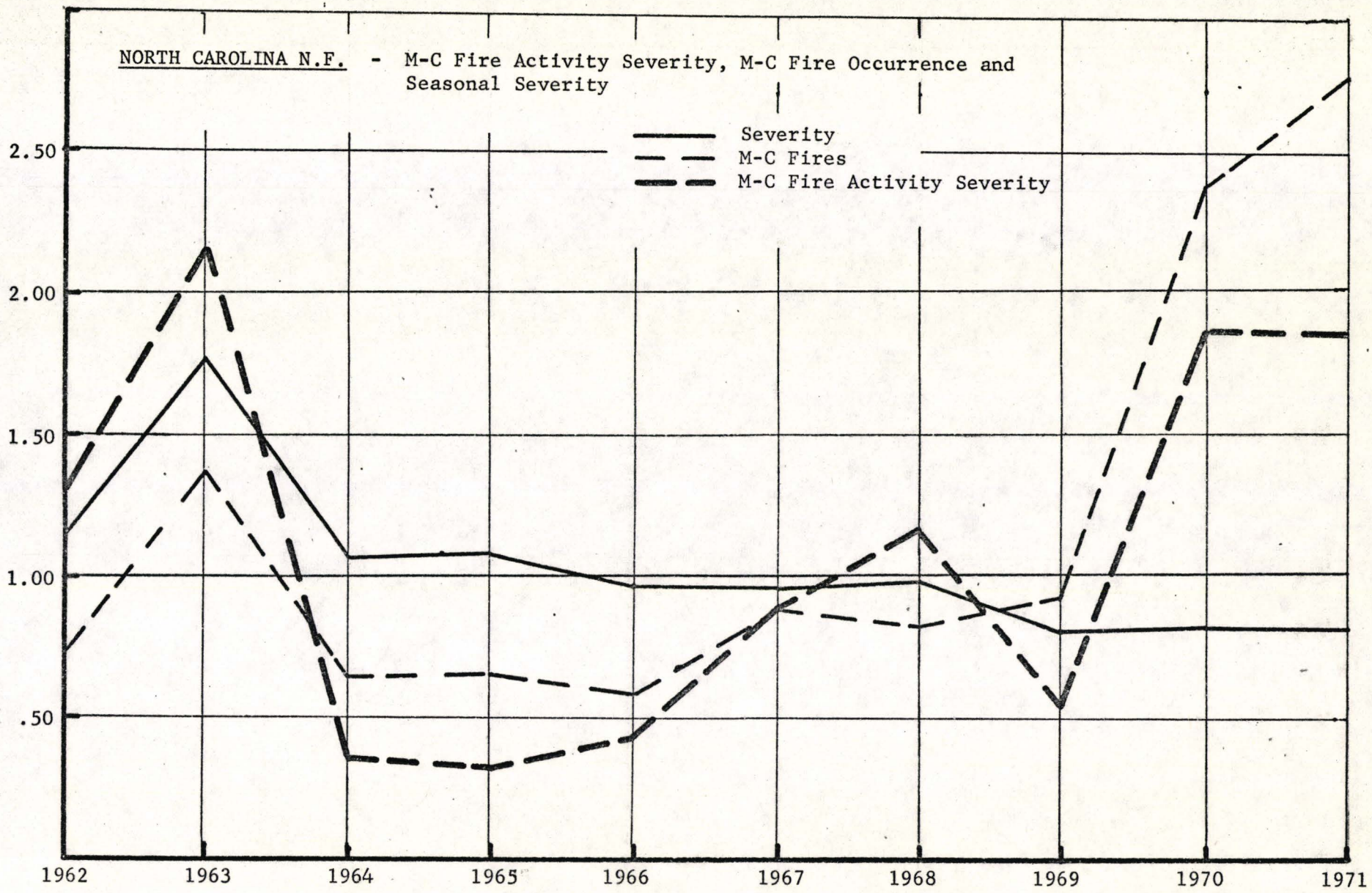
1.00 = Severity, 1962-71, Zone 5-E
1.00 = M-C Fires, Average 1962-71, 109 Fires
1.00 = Fire Activity (Severity): M-C Fires, 1962-71 Ave., 109 Fires; M-C Acres Burned, 1962-71, Ave., 12,725 Acres; Damages, 1962-71, Ave., M-C Fire Damages, $5,024,399.



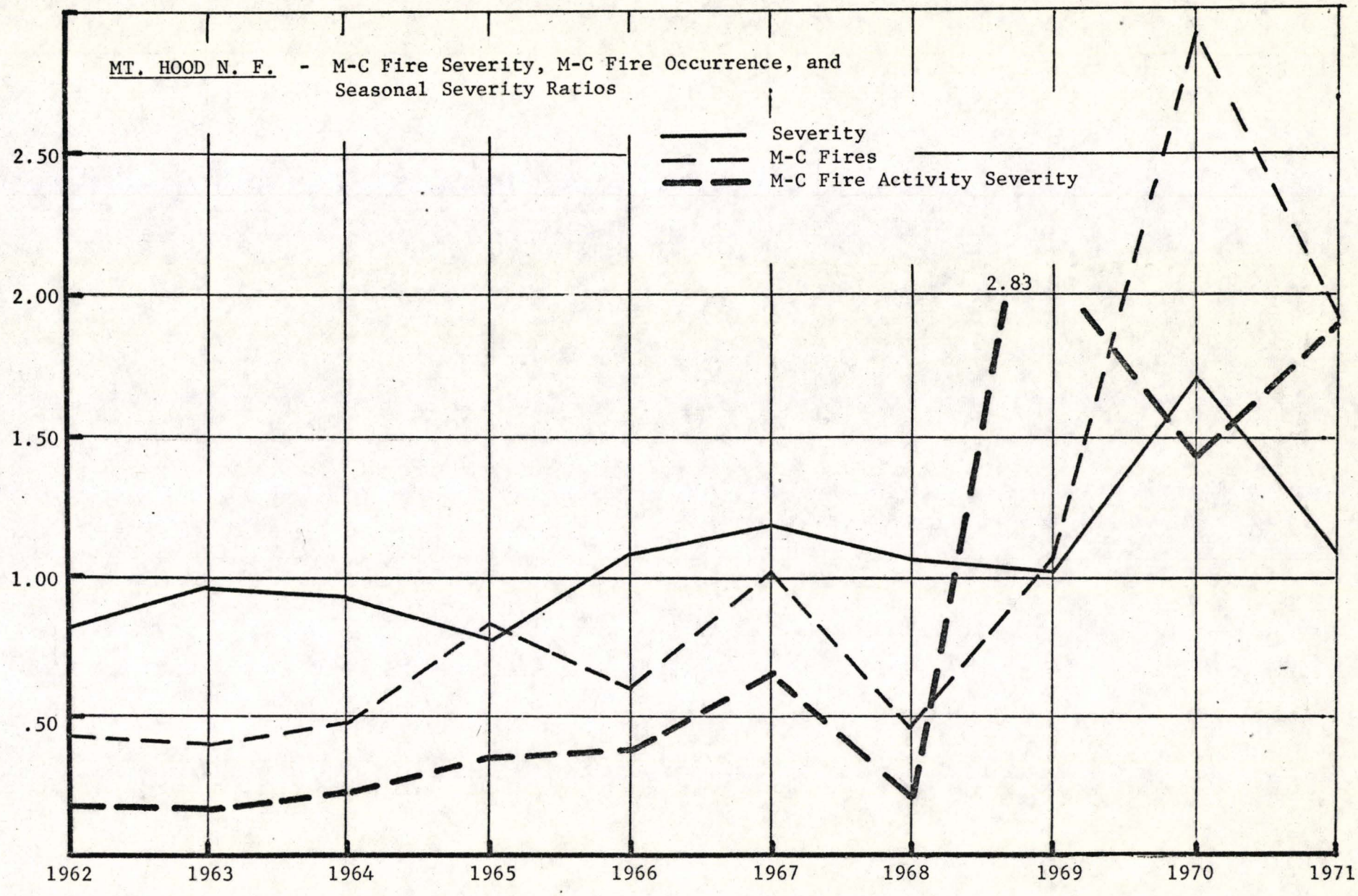
1.00 = 1962-71 Severity, Zone 5-E
1.00 = M-C Fires, 1962-71 Ave. 55 Fires
1.00 = Fire Activity (Severity): M-C Fires, 1962-71, Ave. 55 Fires; M-C Acres Burned 1962-71, Ave. 24,522 Acres; Damage, 1962-71 Ave. M-C Fire Damage $2,509,345.



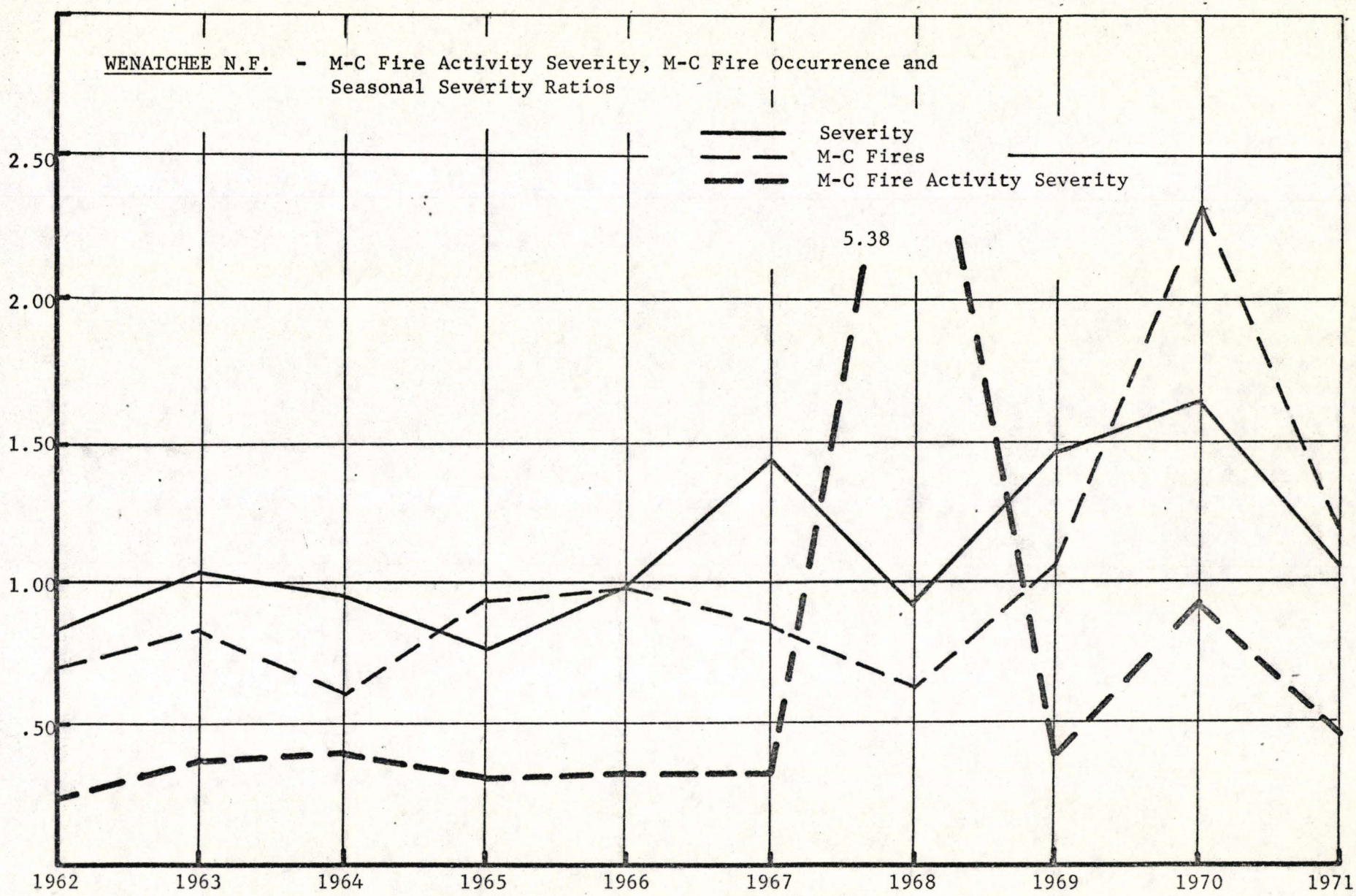
1.00 = 1962-71 Severity, Zone 5-E.
1.00 = M-C Fires, 1962-71 Ave. 65 Fires.
1.00 = Fire Activity (Severity): M-C Fires, 1962-71 Ave. 65 Fires; M-C Acres Burned, 1962-71 Ave. 11,710 Acres; Damages, 1962-71 Ave. M-C Fire Damage $1,170,562.



1.00 = 1962-71, Severity, Zone 8-C.
1.00 = M-C Fires, Average 1962-71, 186 Fires.
1.00 = Fire Activity (Severity): M-C Fires, 1962-71 Ave. 186 Fires; M-C Acres Burned, 1962-71 Ave. 2656 Acres; Damages, 1962-71, Ave. M-C Fire Damage $19,338.

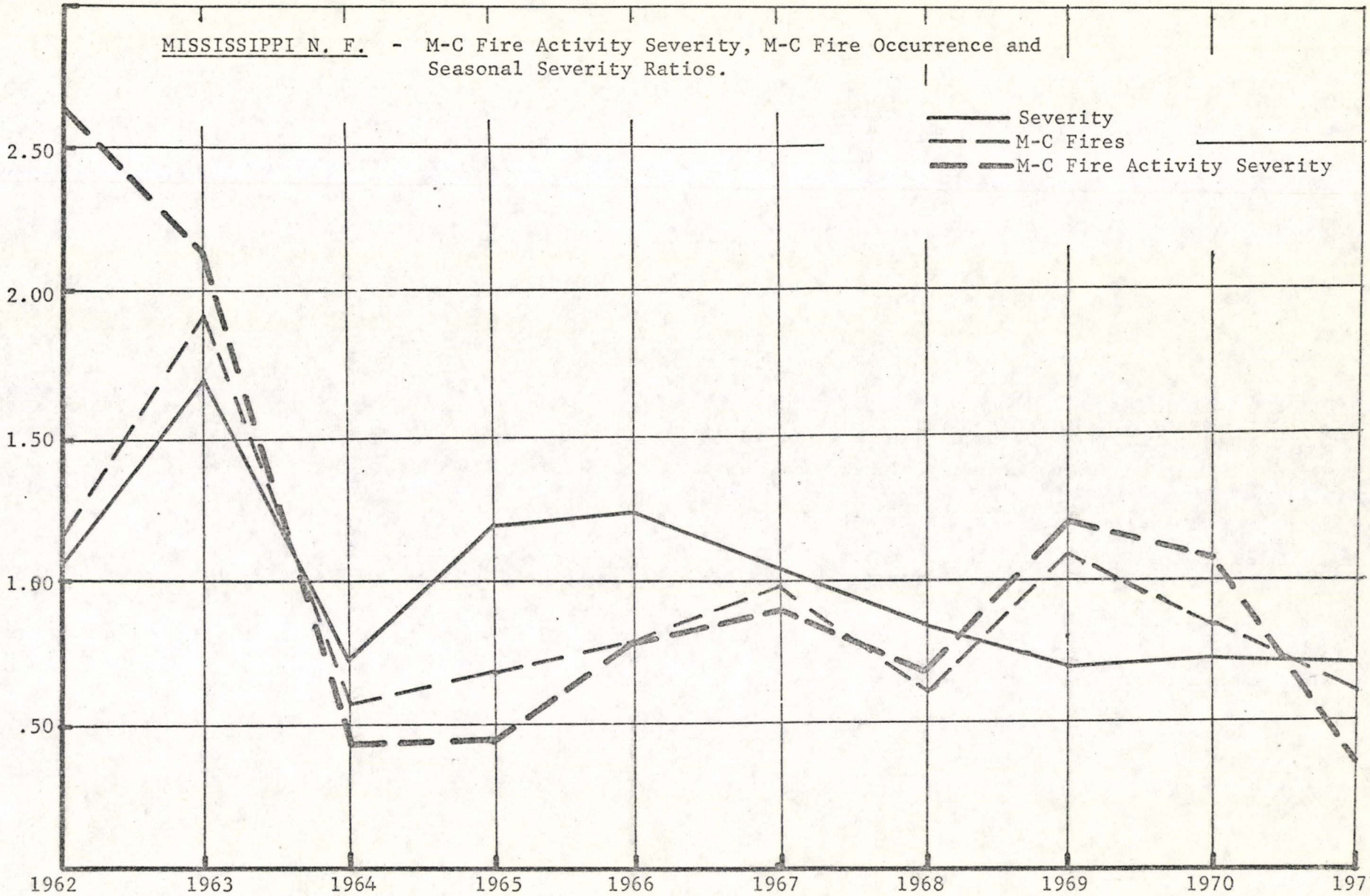


1.00 = 1962-71 Severity.
1.00 = M-C Fire Occurrence, Average 1962-71, 104 Fires.
1.00 = Fire Activity (Severity): M-C Fires, 1962-71, Ave. 104 Fires, M-C Acres Burned, 1962-71 Ave. 670 Acres; Damages, 1962-71, Ave. M-C Fire Damage $476,173.



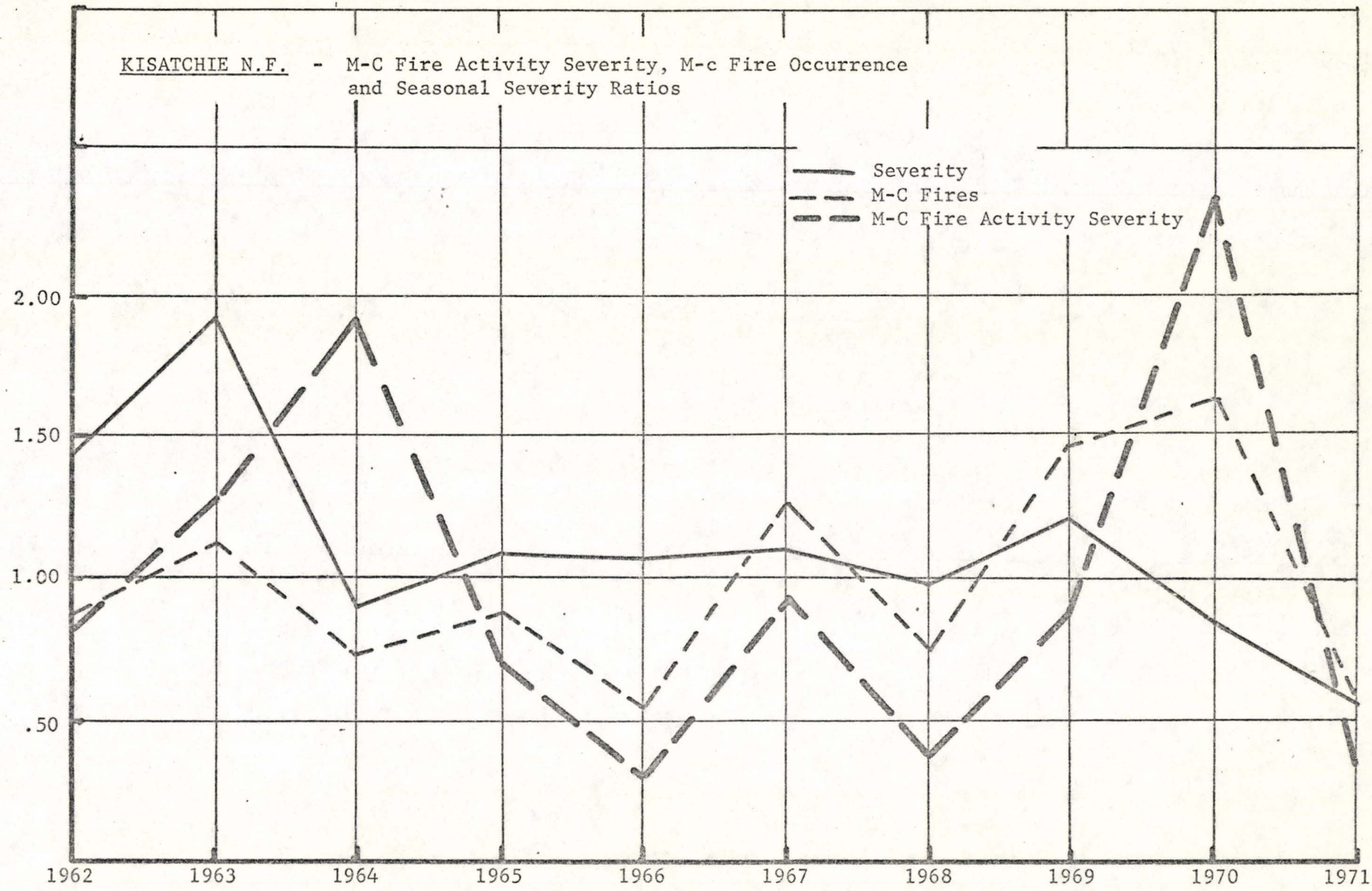
1.00 = 1962-71 Severity, Zone 6-D
1.00 = M-C Fires, Average 1962-71 110 Fires
1.00 = Fire Activity Severity: M-C Fires, 1962-71 Ave. 110 Fires; M-C Fire Acres Burned, 1962-71, Ave. 3,672 Acres; Damages, 1962-71 Ave. M=C Fire Damage $271,384.

MISSISSIPPI N. F. - M-C Fire Activity Severity, M-C Fire Occurrence and Seasonal Severity Ratios.

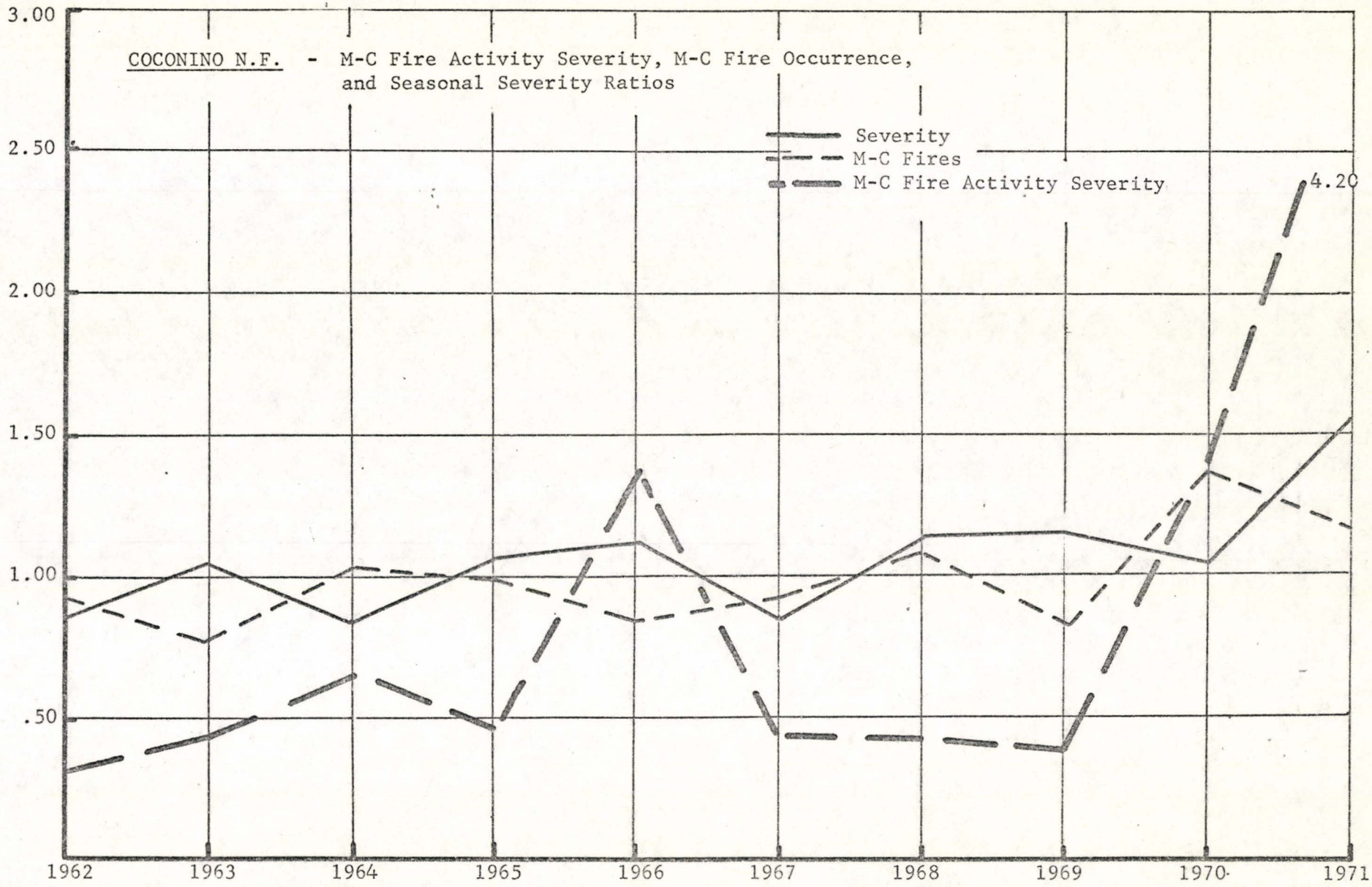


1.00 = 1962-71 Severity, Zone 8-B
1.00 = M-C Fires, Average 1962-71, 246 Fires
1.00 = Fire Activity Severity: M-C Fires, 1962-71 Ave. 246 Fires; M-C Fire Acres Burned, 1962-71, Ave. 2069 Acres; Damages, 1962-71 Ave. M-C Fire Damage $5226.

KISATCHIE N.F. - M-C Fire Activity Severity, M-c Fire Occurrence and Seasonal Severity Ratios

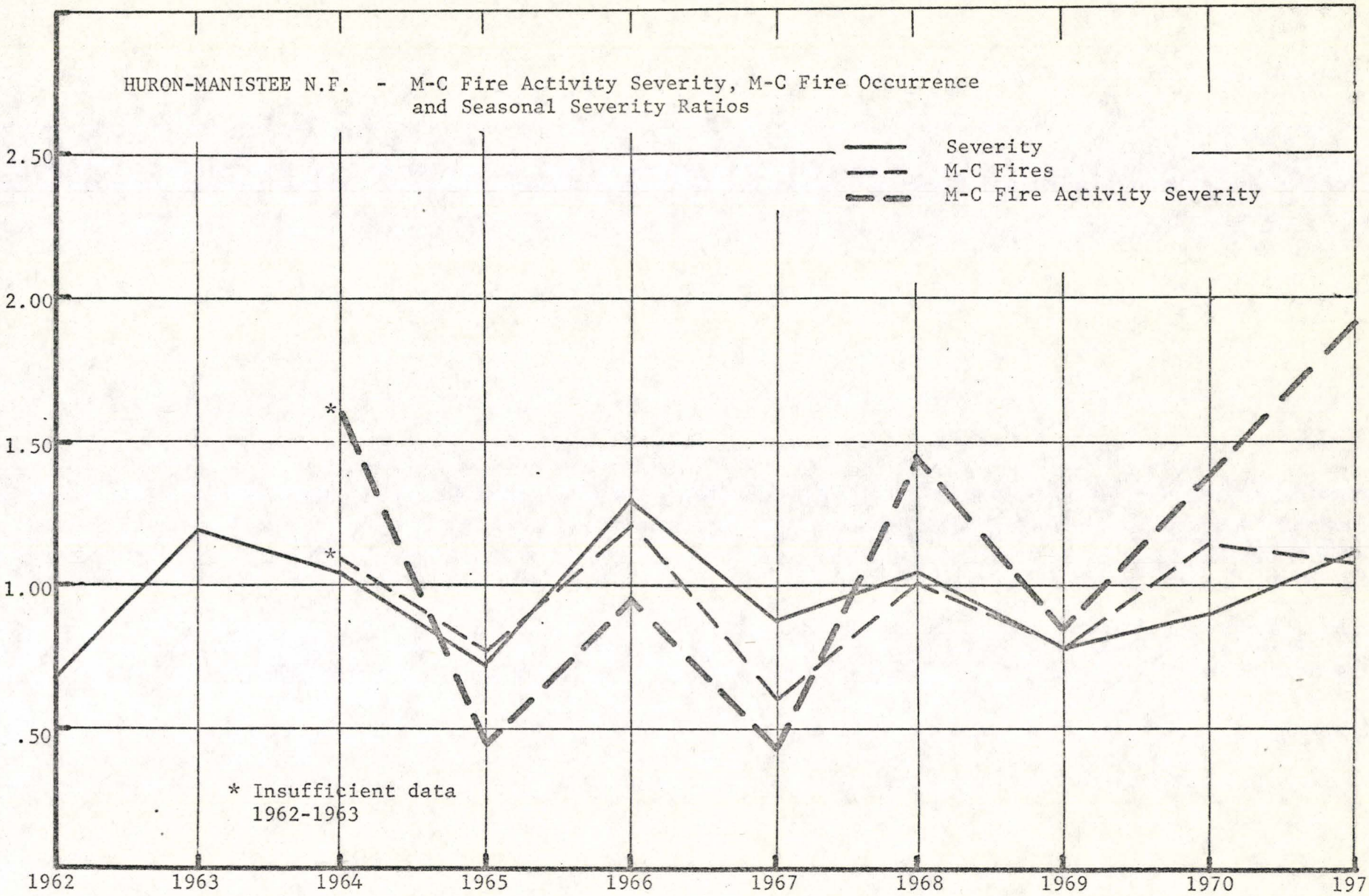


1.00 = 1962-71 Severity, Zone 8-E
1.00 = M-C Fires, Average 1962-71, 147 Fires
1.00 = Fire Activity Severity: M-C Fires, 1962-71 Ave. 147 Fires; M-C Acres Burned, 1962-71, Ave. 2380 Acres; Damage, 1962-71, Ave. M-C Fire Damage $7,737.

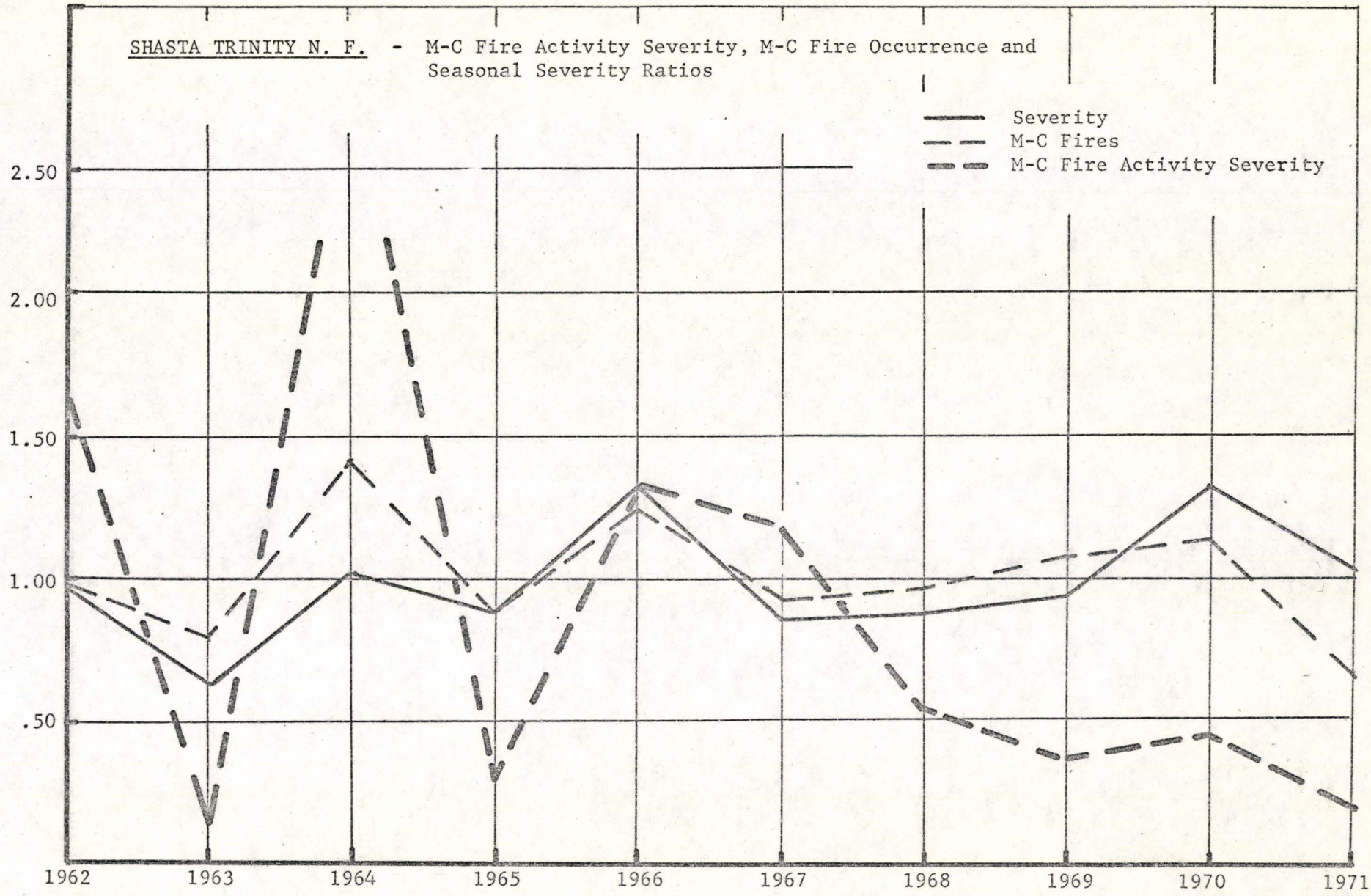


1.00 = 1962-71 (Severity), Zone 3-C
1.00 = M-C Fire Occurrence, Average 1962-71, 91 Fires
1.00 = Fire Activity (Severity): M-C Fires, 1962-71, Ave. 91 Fires; M-C Acres Burned, 1962-71, Ave. 561 Acres; Damages, 1962-71, Ave. M-C Fire Damage $599,071.

HURON-MANISTEE N.F. - M-C Fire Activity Severity, M-C Fire Occurrence and Seasonal Severity Ratios

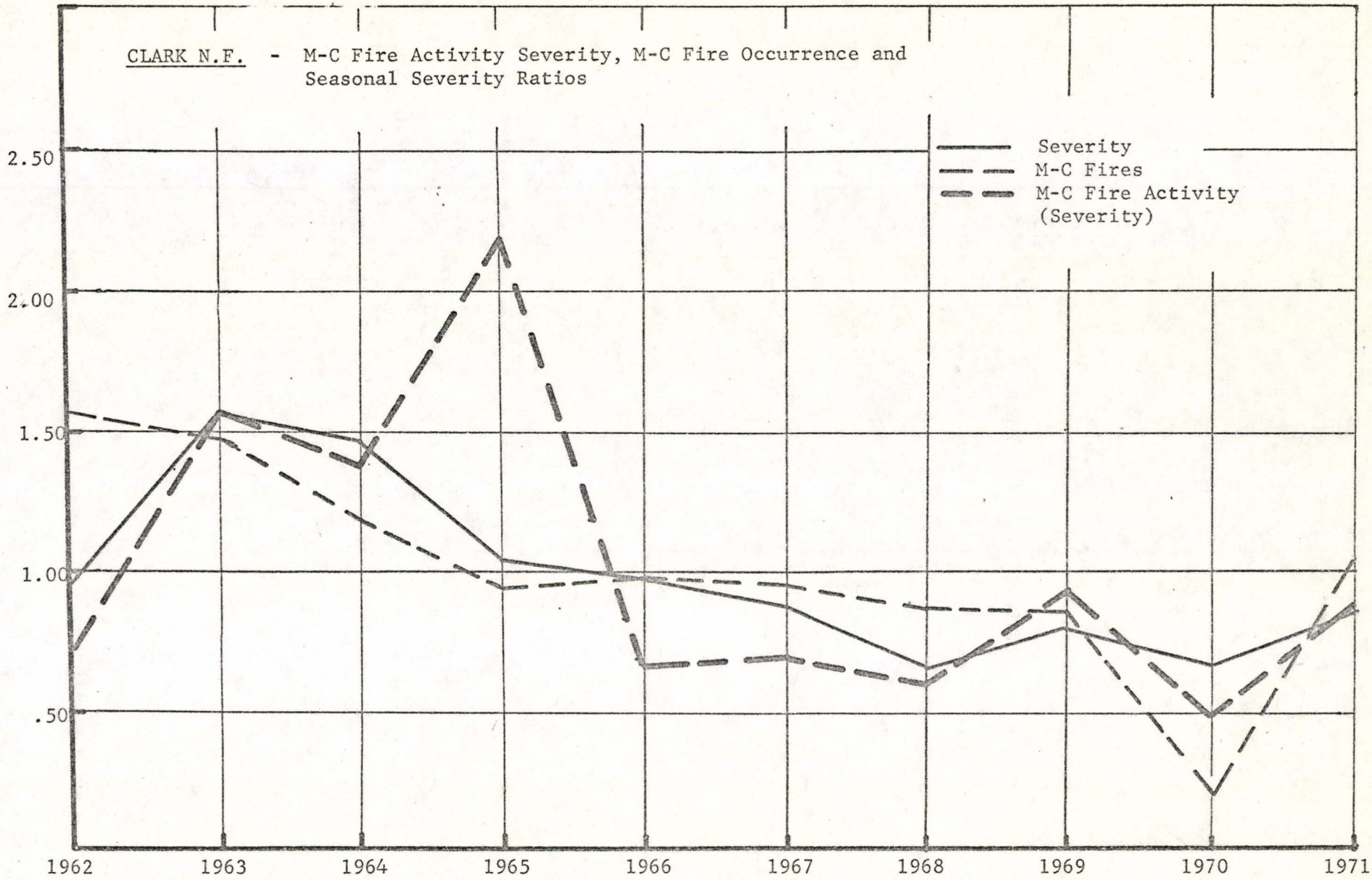


1.00 = 1962-71 Severity, Zone 9-C
1.00 = M-C Fires, Average 1962-71, 143 Fires
1.00 = Fire Activity (Severity): M-C Fires, 1962-71 Ave. 143 Fires; M-C Acres Burned, 1962-71, Ave. 537 Acres; Damages, 1962-71 Ave. M-C Fire Damage $4,679



1.00 = Severity 1962-71, Zone 5-C
1.00 = M-C Fires Average 1962-71, 149 Fires
1.00 = Fire Activity (Severity): M-C Fires, 1962-71 Ave. 149 Fires; M-C Acres Burned, 1962-71, Ave. 922 Acres; Damages, 1962-71 Ave. M-C Fire Damage $160,118.

CLARK N.F. - M-C Fire Activity Severity, M-C Fire Occurrence and Seasonal Severity Ratios



1.00 = 1962-71 Severity, Zone 9-H.
1.00 = M-C Fires, Average 1962-71.
1.00 = Fire Activity (Severity): M-C Fires, 1962-71, Ave. Fires; M-C Acres Burned, 1962-71, Ave. 1521 Acres; Damages, 1962-71 Ave. M=C Damage $18,973.